

NO-A190 035

LOGISTICAL SUPPORT FOR THE HEAVY-LIGHT MIX(U) ARMY
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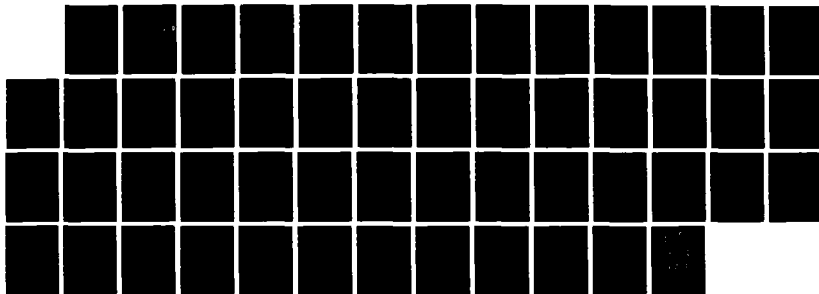
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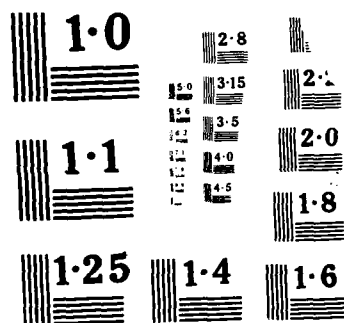
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LOGISTICAL SUPPORT FOR THE HEAVY-LIGHT MIX

by

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Fort Leavenworth, Kansas

20 January 1988

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SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release: distribution unlimited.		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S)			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION School of Advanced Military Studies, USAC&GSC		6b. OFFICE SYMBOL (If applicable) AT/I, -SWV		7a. NAME OF MONITORING ORGANIZATION	
6c. ADDRESS (City, State, and ZIP Code)			7b. ADDRESS (City, State, and ZIP Code)		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (If applicable)		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c. ADDRESS (City, State, and ZIP Code)			10. SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.
			WORK UNIT ACCESSION NO.		
11. TITLE (Include Security Classification) Logistical Support for the Heavy-Light Mix (II).					
12. PERSONAL AUTHOR(S) MAJ Thomas Schmidt, USA					
13a. TYPE OF REPORT Monograph		13b. TIME COVERED FROM _____ TO _____		14. DATE OF REPORT (Year, Month, Day) 1988, JAN 20	
15. PAGE COUNT 47					
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	POL, WW II Maintenance, "II" II		
			Ammunition, IV II Forward Support Battalion		
			Heavy-Light Force Mix		
19. ABSTRACT (Continue on reverse if necessary and identify by block number)					
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20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION		
22a. NAME OF RESPONSIBLE INDIVIDUAL MAJ Thomas Schmidt			22b. TELEPHONE (Include Area Code) 913 626 2135		22c. OFFICE SYMBOL AT/I, -SWV

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Item # 19 continued:

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LOGISTICAL SUPPORT FOR THE HEAVY-LIGHT MIX

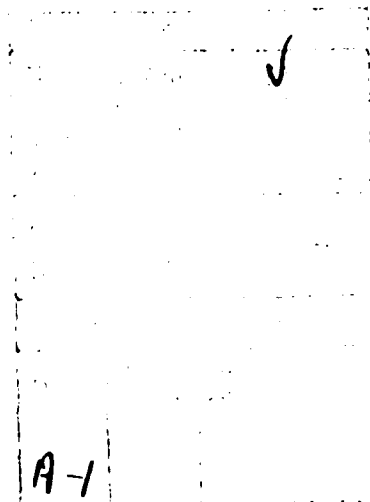
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20 January 1988

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Accepted this 4th day of March 1968.

ABSTRACT

LOGISTICAL SUPPORT FOR THE HEAVY-LIGHT MIX by MAJ Thomas Schmidt, USA, 42 pages.

This monograph addresses the logistical considerations of attaching a heavy brigade to a light infantry division.

It first examines the historical background of combined arms to demonstrate the necessity of creating such a force. It then limits the scope by historically validating ammunition, fuel, and maintenance as the priority sustainment functions for a heavy unit. Further examples describe organizations and procedures which have successfully supported a heavy-light mix of forces in the past. These successes form the basis for evaluating the capability of the US Army's current logistical system to support the heavy brigade attached to the light infantry division.

The parallels between the past and present show the logistician's determination to learn from history. While the physical ability to support this force is marginal, the logistical procedures, concepts of support, and a willingness to innovate all lead to the conclusion that, if asked to, the US Army logistical system can support this or any other envisioned force mix.

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1. Introduction.

The United States Army has no fewer than seven types of combat divisions in its force structure. This is a clear indication that it perceives a need for flexibility and no single type of division can meet all anticipated requirements. The latest addition to the force structure is the light infantry division (LID). Designed for strategic mobility, it is lacking in antiarmor firepower, tactical mobility, and armored protection.¹ These are limitations anywhere, but against a heavily armored/mechanized threat such as the Warsaw Pact, they are definite vulnerabilities. However, the LIDs are a significant portion of the force structure and the commander must be prepared to use them effectively. This includes employment in a European scenario.

NATO can expect only short notice of an imminent Warsaw Pact attack. The strategic mobility of the LIDs will place them among the first reinforcements to arrive in theater. Despite their limitations they can contribute significantly to NATO's defense. The terrain of Western Europe -- variously mountainous, heavily forested, and/or urbanized -- provides ample opportunity for the effective use of light infantry.² Restrictive terrain mitigates the limitations of the LIDs by making rapid mobility unnecessary, providing protection, and maximizing the effect of the LID's short range antitank weapons.³

To enhance the tactical mobility and firepower of the

LID a commander can attach a heavy brigade to it. This may alleviate some of the vulnerability of the LID. But can the US Army logistics system support a heavy brigade attached to a light division?

II. Historical Overview.

Before one addresses the logistics problem, he must establish a reasonable probability that such a light-heavy force mix is desirable. It is assumed that the Army will use the LIDs in Europe, if only because they can get there sooner than anyone else* and because the terrain in Western Europe is suitable for the use of light infantry. The question remains: Should the commander create a light-heavy force mix?

A. Combined Arms Imperative.

The mutually supporting nature of infantry and armor is a fundamental premise behind the US Army combined arms concept. The seeds of this concept were sown during the first World War, but it took the successful German blitzkrieg into France in 1940 to drive the point home.* Advocates of combined arms warfare arose in nearly every major power during the inter-war years -- Fuller in Great Britain, Guderian in Germany, De Gaulle in France, Tukhachevsky in the Soviet Union, and Chaffee in the United States, among others.* They emphasized armor and mechanized infantry which could keep pace with the tanks.

Each had a keen understanding of the mutual support required for the success of either armor or infantry.

The German Army began World War II (WW II) with the most highly developed combined arms concept, organization, and training among the European powers. The 1939 Blitzkrieg in Poland provided valuable lessons regarding the proper mix of heavy and light forces. Their Panzer divisions had proved too unwieldy for many commanders, while their light divisions lacked firepower.⁷ Changes in division structures made over the ensuing winter resulted in a much more balanced force. This is the force that swept across France in 1940. Even the armored spearheads which penetrated the Ardennes sector relied on infantry to effect the crucial crossings of the Meuse River.⁸ The infantry-armor mix, in the context of an even broader combined arms concept, was instrumental to the German success.

In contrast, the French Army had begun working toward combined arms too late to have an effective force when Germany attacked. Basing their doctrine on the superior strength of the defensive, the French spent their money on the Maginot Line rather than mechanized or armored forces. Armor built in the late 1930's was dispersed throughout the force structure. The few light mechanized divisions lacked the firepower to match the Panzer divisions they were asked to halt in 1940. The three hastily organized armored divisions had no experience in division-sized maneuver and in fact two of the three entered the battle of France in battalion-sized increments. The French employed the rest of their armor as battalion-size forces more

or less evenly dispersed across the entire front.⁹ Reacting piecemeal to German penetrations, French armor lacked the mass and speed to block the Germans effectively. Though possessing a better tank, the French decision to employ it separately rather than as an element of a combined arms team, negated their advantages and contributed to their rapid defeat.

The Soviets were the next victims of the Blitzkrieg. Facing German formations whose combined arms execution peaked during their offensive into Russia, the Soviets lost one army after another.¹⁰ Though they quickly recognized the advantages of German style combined arms, it was not until 1943 that the Soviets were able to produce enough tanks to implement a combined arms concept suitable for the wide open terrain of European Russia. Once they were able to work as combined arms, the Soviets began to sweep the German Army out of eastern Europe.

The British Army, having experienced the German attack across France, entered North Africa determined to employ effective combined arms. After initial success against the Italians, they were quickly overpowered by the Germans. While the British had adapted combined arms organization, they had not mastered the tactics. British combined arms consisted of battalion and sometimes brigade formations. Divisions and corps had not yet absorbed the techniques of fighting combined. As a result, battalion and brigade operations were scattered and uncoordinated efforts that had little effect on the larger battle. Only when Field Marshall Montgomery forced combined arms cooperation at all levels did the British army in North

Africa begin to meet with any sort of success against the Afrika Korps.¹¹

The United States Army, given the luxury of time, recognized the need and prepared for combined arms warfare. The June 1944 edition of FM 100-5, Operations, stated that an infantry force fighting a combined arms enemy must be supported by tanks¹² and, conversely, the primary role of armored infantry was to support tanks.¹³ To complement this concept, the army experimented with several organizations prior to entering the war in Europe. By 1943, US divisions were approximately balanced between armor and infantry. Many lessons were yet to be learned regarding tactics of combined arms warfare, but this structure remained in place for the rest of the war.¹⁴

Several years after WW II, the US Army received a costly review of the combined arms lessons learned during WW II. In June, 1950, the North Korean Army launched an all-out attack into the Republic of Korea (South Korea). Though the Korean Peninsula was generally considered unsuitable for armored warfare, the North Korean columns of infantry were led by tanks. Neither the South Korean Army nor the first US forces to encounter the North Koreans were equipped to stop tanks. When terrain, obstacles, or the limited antitank capability available did manage to halt a North Korean tank column, the defenders quickly found themselves outflanked by infantry and forced to withdraw. The 1st Marine Division, a combined arms organization with its M-26 tanks, was the first US unit consistently able to halt the North Korean units it engaged.

The time it took to relearn the need for and practice of combined arms warfare undoubtedly cost many US soldiers their lives. "8

The short military history of the Israeli Defense Forces (IDF) has seen their ground forces evolve from an early infantry force into an armor-oriented organization with only a few poorly equipped infantry units in 1973. Based on their experiences in the 1956 and 1967 wars, the IDF came to believe that a potent armor force was sufficient to win the ground war. Prior to the 1973 war, Israeli infantry was neglected almost to the point of extinction. "6 The devastating effect of the new antitank guided missiles probably caused more than one Israeli commander to cry to higher headquarters that: "I need infantry...I need infantry!". "7 Changes since 1973 have moved the IDF, though still heavily armor-oriented, toward a more balanced force with better equipped and trained infantry.

The experiences of WW II, Korea, and the Mid East wars have shown us time and again that neither infantry nor armor can sustain combat without the support of the other. While the Light Infantry Division can certainly contribute to the defense of Europe, history has shown us that an infantry-armor mix as part of a well-trained combined arms team will be far more effective. In the future we will not have the time to relearn the lessons of history.

A foundation of our doctrine is combined arms warfare. In a European scenario, the LIDs must be able to fight combined. While numerous articles have proposed attaching a

light force to a heavy unit, we must be equally prepared for the opposite. Experience in the Ardennes and Korea have shown that terrain may hinder use of armor, but rarely will it completely eliminate armor capability. Soviet armies likely to participate in an invasion of western Europe are all tank/mechanized infantry forces. Their doctrine demands rapid penetration of NATO defenses and quick exploitation of success.

Our mechanized and armored divisions habitually maintain a counterattack force to limit and eliminate penetrations. The LID must be capable of the same reaction. Organically, they are not. To provide the speed, firepower, and protection they need to defeat a determined tank/mech attack, we must consider attaching a heavy brigade to the LID defending in Europe.

B. CSS Priorities: Fuel, ammunition, maintenance.

Before creating such a force, a commander must consider the sustainment requirements. While a heavy division can support an attached light force with relative ease, the opposite may not hold true. One of the problems which then confronts the logistician is how to support the heavy brigade logistically.

The US Army has painfully come to realize that we cannot ignore logistics preparations and hope to deal with them as problems arise. Logistics requirements must be anticipated and planned for prior to the start of combat operations.

Attaching a heavy brigade to a Light Infantry Division poses several unique problems for the logistician. Though requirements in several types of supply and services are relatively unchanged -- e.g., food, clothing, medical -- there are obvious differences in the amount and type of fuel, ammunition, and maintenance needed. Planners must recognize the critical nature of these requirements (fuel, ammo, and maintenance), estimate their impact on the logistics system, and insure that the proposed force mix can be supported before it is employed in the field.

The following examples illustrate the importance of fuel, ammunition, and maintenance to continued operations. A later section will deal with the logistics organizations and procedures which supported the tactical user.

German Army Group A in Russia in 1942, Patton's 3rd Army in its dash to the Rhine, and the Soviet 4th Tank Army during the Vistula-Oder campaign are but a few examples of major operations being stopped or delayed due to logistical shortcomings. Fuel -- specifically its distribution -- was the limiting factor in all three of the operations mentioned above. Army Group A experienced tremendous tactical success in its drive across southern Russia. However, though fuel had been stockpiled and was available, the Germans were unable to transport enough of it forward to sustain momentum. As German lines lengthened into the Caucasus, lack of fuel at the front as much as any Soviet action halted the advance. ¹⁰

Patton's problem in 1944 was similar. Pursuing German

forces since the Allied breakout from the Normandy beachhead. 3rd Army's line of supply rapidly outgrew the capability to keep the army supplied. As priority of supply was given to Montgomery's Army Group, the situation deteriorated. Despite expediencies such as the now famous "Redball Express", 3rd Army ground to a halt on 2 September and again in early October. Though lead elements held crossings over the Moselle, the pursuit had ended. The Rhine would have to be crossed in the face of a defending enemy, rather than a fleeing one.¹⁹

The Soviet preferred method of conducting offensive operations in WW II included deep penetrations and exploitations by armored mobile groups. This was a key to their rapid advances during the Vistula-Oder Operation in 1945. Again, resupply of fuel limited the degree of success enjoyed. The 2nd Guards Tank Army was forced to discontinue offensive operations for four days due to lack of fuel. The 4th Tank Army reached its deep objective -- the Oder River. However, lack of fuel limited their crossing of the river to just one tank brigade.²⁰ Studying this and similar operations in later years, the Soviets have come to believe that, " The prompt fuel supply...was one of the basic problems, the solving of which frequently determined the outcome of not only the army-level, but also the front-level offensive operations.".²¹

While adequate fuel will allow maneuver and mobility, we must also be in a position to destroy the enemy. Destruction requires ammunition. Like fuel, ammunition shortages

impacted on their share of operations both during and since WW II. The most serious instance occurred on the Brittany peninsula.²² Essentially, VIII Corps (US) was unable to reduce the German defenses at Brest primarily due to a shortage of artillery ammunition. This shortage was the result of poor strategic planning, lack of tactical planning, shortage of transportation, disagreement on the amount of ammunition required, confusion concerning support relationships, and just about any other problem one can envision. Though not typical of supply operations in WW II, this experience demonstrated the numerous things that can hinder effective resupply of ammo. If Clausewitz was correct in saying that "Fighting is the central military act"²³ and war "is resolved by bloodshed",²⁴ then the critical nature of ammunition is obvious. Supporting Clausewitz's assertion, the US, Soviet, and German armies all made resupply of ammunition, along with food and fuel, the top three priorities of their supply system.

Fuel and ammunition are essential only as long as there are weapons systems using them. The lethality of the modern battlefield promises significant attrition of these systems. At the same time the US Army's ability to replace large numbers of systems is severely limited. The key to keeping an effective force on the battlefield is to repair damaged systems quickly and far forward. This was one of the first lessons learned by the German army in WW II. Despite the outward success of the invasion of Poland, the German army found itself nearly immobilized after advancing halfway

through the country. This situation arose because the Germans located maintenance facilities far to the rear. Soldiers needed at the front had to evacuate vehicles over 200 kilometers before repairs could be undertaken. Later actions found German maintenance personnel located well forward with the combat units. "

Perhaps the best and most applicable example of the impact of maintenance on a battle or war derives from the 1973 Arab-Israeli war. Repair of battle damaged equipment was a major source of resupply and reinforcement for the Israeli Defense Forces (IDF). For example, one battalion virtually wiped out by the loss of 19 of 21 tanks on 8 October, was able to reassemble a force of 25 tanks by 9 October. This type of regeneration of combat power was not unusual. It derived from a system of maintenance designed to keep firepower on the battlefield. Ordnance personnel were attached to combat battalions and maintenance facilities up to and including general support level were located within 20 kilometers of the front. " The Israeli effort in 1973 is set apart from similar US accomplishments in WW II because of the increased lethality of weapons -- particularly anti-tank guided missiles, compressed time, and lack of a significant strategic stockpile of replacement equipment. These factors, similar to what the US could anticipate in a European war, made a successful maintenance and resupply program that much more critical.

While the examples above illustrate the importance of fuel, ammunition, and maintenance to successful combat

operations, they also give some indication of the factors behind success and failure in providing them. In these and other cases, fuel was generally available in theater. An inability to get it forward was the most prevalent problem. Though ammunition expenditures were often strictly controlled throughout a theater, planning and allocating transport was again the discriminator between success and failure. When maintenance facilities were located far to the rear, forces were unable to cope with battle damage. The time, transport and personnel needed to evacuate damaged equipment compounded the problems of the original loss. When located far forward and organized to provide on site repair, maintenance efforts contributed to success. German, American, and Soviet support systems in WW II evolved in recognition of these factors.

C. Successful systems and procedures.

It was and is the responsibility of the strategic and operational planners to insure that adequate supplies are available for campaigns and major operations. The logistics system must in turn be capable of providing these supplies and services to the tactical user. The following examples detail some of the characteristics of successful logistics systems and procedures.

As mentioned, the German Army invaded Poland with a highly centralized logistics system. While this proved adequate for the short Blitzkrieg campaigns in Poland and France, the problems of long supply and evacuation routes

were recognized. As the campaigns in North Africa and later Russia continued over extended periods, the Germans found that consolidated maintenance units were unable to keep a sufficient number of tanks in the field. By 1943, execution of maintenance had become highly decentralized.²⁷ Each tank company had a maintenance detachment for on-site repairs. Repairs requiring 12 or more hours to effect, were evacuated to the maintenance company at regimental level, where they could be held for 14 days. The detachment moved with the combat element, while the regimental company was located within 70 kilometers of the front. If the tank regiment anticipated a surge requirement, additional maintenance and evacuation companies were available from Army or Army Group level. Supplies of ammunition and fuel were also pushed down to the regiment, again from Army level. Hence, the German tank regiment was not tied to any specific division or corps organization. Rather, it could operate with any other unit or, when necessary, independently.

Like the Germans, the Soviets had the ability to assign tanks where they were needed rather than having them tied to a specific organization. Though large tank formations became the rule, Soviet tank brigades were organized to be self sufficient in terms of fuel, ammunition and maintenance for several days. After that period, resupply would be pushed from Army level, often even Front level, down to the brigade or regiment. To insure adequate and timely resupply to the tank units Army level depots were often made mobile by loading their entire stocks on trucks and following forty to

fifty kilometers behind the fighting forces. Following the philosophy that "It's not the troop's job to think of the rear, but the rear's job to think of the troops.",²⁸ Soviets could employ their tank formations as dictated by the tactical situation. Army and Front rear services would ensure that they were supplied.

The US system was based on the same desire to provide flexibility to the combat commander. The field army was intended to be both a combat and an administrative agency, while corps would be combat headquarters only. Nondivisional battalions and the battalions and regiments of the divisions were designed to mesh directly with Army level support. The system bypassed the corps and sometimes division. For food, fuel, and ammunition "division and corps are not in the channel of supply, except in emergencies."²⁹

In accordance with these concepts, separate tank battalions and tank destroyer battalions contained sufficient transportation to pick up supplies, including fuel and ammo, from Army level supply points. Their organic maintenance sections were capable of first and second echelon maintenance as well as the evacuation of more severely damaged equipment to collection points. Though sometimes allocated to specific corps, higher level maintenance, supply, and transportation assets were generally controlled at Army level. While theater priorities of supply could result in shortages at Army level, the system of supplying heavy units attached to infantry divisions was effective. For example, despite the poor tactical outcome of the 28th Infantry Division's battle

for Schmidt, the attached 707th Tank Battalion and 893rd Tank Destroyer Battalion were able to keep themselves supplied with ammo and fuel, even when nearly surrounded in the Komerscheidt salient.³⁰ Maintenance teams, though their mobility was severely limited by the terrain, were available and attempted to repair or evacuate all but the completely destroyed systems. These accomplishments were independent of the infantry unit to which they were assigned.

US corps often attached combat commands (CC) of the armored divisions to infantry divisions. Since the support structure was independent of the infantry division to which the CC was attached, the commander had great flexibility to employ the armor force where the situation dictated. For example, during the early stages of the First United States Army's (FUSA) breakout and pursuit of German forces -- the Cobra and Mortaine campaigns -- CC A of the 3rd Armored Division (AD) was attached to the 9th Infantry Division (ID) from 10 to 16 July and the 1st ID from 1 to 12 August.³¹ At the same time, CC B was attached to the 1st ID (20-29 July), the 4th ID (1-4 August), the 1st ID (4-7 August), and the 30th ID (7-12 August).³² Such rapid attachment and detachment of the armored combat commands was common not only in the offense but also in the defense. During the German Ardennes offensive, CC B, 3 AD, went from its parent unit to the 30th ID on 20 December and returned on the 24th.³³ Throughout the battle of the Bulge the CCs of the armored divisions were used to increase the firepower of the infantry units in defensive positions, to counterattack German

penetrations, or to seal gaps caused by the movement of other units. How were these rapidly shifting combat elements supported?

Division and corps operations orders and after action reports from FUSA elements in the European campaigns contain only minimal references to logistics. This is understandable in light of the FUSA standard operating procedures and directives. These stressed the priority of class I, III, and V supply while insisting that Army would supply these items down to the user level. This relieved the divisions and corps of much of the logistical burden.²⁴ In one instance, a corps offered to provide transportation to enable increased stockage at forward ammunition supply points (ASP) and expedite throughput of artillery ammunition to the firing batteries. FUSA replied that they would effect the desired increase and throughput using Army assets. The corps would not have to provide transportation.²⁵

Normally, battalions drew fuel from truckheads established by the Army Quartermaster units. Army level Ordnance Ammunition units would establish forward ammunition supply points within reach of using units. Army level maintenance units would support down to the division level with contact teams still farther forward. Vehicles and weapons were evacuated to a collection point where the higher headquarters would assume responsibility for them. Whenever possible, a replacement would be issued on the spot.²⁶

When the system was working as designed, divisions and corps were largely relieved of logistics responsibility.

When the operational situation warranted, Army was able to assign additional quartermaster or ordnance units to weight their effort. " In at least one case , FUSA attached a forward ASP directly to a combat command (CC A, 3 AD), itself attached to an infantry division. "

FUSA did not hesitate to use unusual methods to support its forces. When units were unable to recover widely scattered vehicles with their own resources, FUSA converted an evacuation company into a collection company putting available manpower where it was most needed. " When distribution of ammunition and other supplies overloaded unit assets, Army assigned an ammunition handling unit to haul supplies. " FUSA felt that centralized control of logistics assets gave them more flexibility in providing decentralized support. As the campaign progressed centralization increased. For example, all ordnance units previously assigned to the corps were pulled back to army level in April 1945. "

Centralized control by army did achieve logistical flexibility which in turn allowed tactical and operational flexibility. When the Army assumed responsibility for supplying their units down to user level and assisting with maintenance as far forward as possible, corps and divisions were able to shift combat units to critical spots immediately, with little logistical disruption. A combat command drew supplies from the nearest truckhead or ASP, established by Army. Maintenance, collection, and evacuation units served on an area basis and could be readily augmented

by the centrally controlled assets at Army level.

Logistically it made little difference to the combat command whether they were with their parent division or attached to an infantry division. The majority of their support came from the Army level and remained effective. Though assets were centrally controlled, FUSA's objective was to provide decentralized support throughout the Army. Initiative and dedication within the supply system allowed FUSA to meet this objective.

The more mobile and lethal battlefield of the 1973 Arab-Israeli war saw a more centralized but otherwise similar system. In the Sinai, ordnance teams were assigned to tank battalions for first and second echelon maintenance. Third echelon was accomplished by forward companies of the division maintenance units. The division base company provided fourth echelon maintenance within 40 kilometers of the front. Roving detachments made on-site repairs or evacuated tanks to collection points as appropriate. Supply was accomplished through centralized stocks and transportation with deliveries down to the user level. 42

These examples show that at the division and lower level this combination of maintenance forward and supply from echelons above corps to the user has historically been successful. When stocks were available and priority was given to fuel and ammunition, heavy units were able to continue fighting. Corps and division played a comparatively small role in logistical support, especially in the case of heavy units fighting for infantry headquarters.

III. Current CSS Capabilities and Future Trends.

In the US Army today, the corps and division have a much more significant role in logistical operations. The corps, with combat, administrative and logistical functions is more analagous to the WW II Army than to the corps of that time. With its variety of nondivisional combat, combat support, and combat service support units, the corps is able to influence the battlefield directly with combat power and indirectly through established sustainment priorities. Unlike the WW II corps, it is an essential player in the logistics system, as was the WW II Army. Given the similarity of roles and capabilities of the WW II Army and the modern corps, one can apply the experiences of WW II's Army to today's corps. The corps' capabilities and limitations must be considered -- along with those of the division -- when sustainment plans are made.

The original question concerns the US Army's ability to support a heavy brigade attached to a light infantry division. While the heavy brigade will bring a Forward Support Battalion (FSB) from its parent division DISCOM, it will lose the capability contained in the heavy division DISCOM's Main Support Battalion (MSB). To what extent can the LID DISCOM make up this loss? If shortfalls exist, can Corps compensate? Or, must the US Army change its logistic system before it can even contemplate a heavy-light mix of this nature? The rest of this study will attempt to answer

these questions.

This example will use units from the notional troop list used in the US Army Command and General Staff College instruction. Assume that a balanced brigade, the 3rd, from the 52nd Mechanized Division has been attached to the 21st Infantry Division (Light), which in turn has sent its 3rd Brigade to the 52nd Mech. Both units remain in the 10th Corps which also includes the 208th Armored Cavalry Regiment, the 23rd and 25th Armored Divisions, and listed Corps troops and the 10th Corps Support Command (COSCOM). (Troop List attached as Appendix A)

The US Army concept of logistical support appears to take the lessons learned from history to heart. FM 100-5, Operations, states that firepower, agility, and endurance can make the difference in a battle. " To assist the combat commander in developing and employing these capabilities, the combat service support (CSS) planner must provide adequate ammunition, fuel, and maintenance. This corresponds to the key sustainment functions - arming, fueling, and fixing. " Among the principles governing the planning of support for the tactical commander are:

- Support must be continuous and adequate.
- CSS functions should be performed as far forward as possible.
- Committed units must be supported by "push" packages rather than by requisition. "

Combining these key functions and principles, a central part of the US Army CSS concept is to provide fuel and ammunition from higher to user and perform as much maintenance as possible as far forward as possible. This concept corresponds to the successful methods of supply and maintenance observed in the historical examples discussed.

The organization of the DISCOM in the J-Series Table of Organization and Equipment (TOE) is designed to complement this CSS concept. In the areas of fuel, ammunition, and maintenance, responsibility for support rests with the main support battalion and the forward support battalions (FSB).

In this example the 3rd Brigade, 52nd Mech Division is accompanied by its habitually associated FSB. The figures given in Student Text 101-2, Planning Factors, specify the requirements for fuel, ammunition, and maintenance man-hours for the brigade in a defensive posture in Central Europe. (Calculations in Appendix B) The Forward Support Battalion's TO&E delineates the FSB's capability to meet these requirements.

3rd Brigade will require over 380 tons of ammunition the first day they are heavily engaged and 230 tons resupply daily thereafter as long as they remain engaged. The FSB is capable of transloading 300 tons daily. Subtracting the basic load already on the combat vehicles on day one (180+ tons), the resupply requirement is clearly within the capability of the FSB, though combat losses of truck assets may eventually require augmentation from division or corps assets. Since the ammunition supply is transported from

Corps directly to the Ammunition Transfer Point established by the FSB in the Brigade Support Area, the loss of the Main Support Battalion at DISCOM is not a factor.

The fuel requirement for the brigade plus the FSB totals 187,421 gallons of diesel and 12,740 gallons of MOGAS - just over 200,000 gallons. The organic assets of the battalions are capable of storing and issuing 85,200 gallons at a time. The FSB is capable of storing and issuing 53,600 gallons on the ground while transporting and distributing an additional 83,600 gallons - a total of 137,200 gallons. While the MSB has a considerable capability to store and distribute fuel, they distribute to the FSBs, not the user. Hence the loss of the MSB again has no effect on the problem. The COSCOM is willing and capable of transporting and supplying fuel directly to the FSB. As the battalions can move more fuel than the FSB can supply, the FSB is the limiting factor. The apparent shortfall of over 60,000 gallons in the FSB's capacity must be addressed.

Several factors taken singly or in combination should serve to alleviate this apparent problem.

- Assets of the battalions could draw fuel directly from the COSCOM, thereby eliminating the bottleneck at the FSB. Making two trips a day, they can issue 170,400 gallons a day. Added to the FSB's ability to issue 83,600 gallons a day, the total capability is raised to 254,000 gallons, more than enough to meet the 200,000 gallon requirement.

- FM 63-2-2, Combat Service Support Operations: Armored, Mechanized, and Motorized Divisions, states that, "when a

divisional brigade is deployed out of sector, a provisional support organization consisting of DISCOM units is formed, attached to, and deployed with the brigade". " In this case, the DISCOM support will be limited , as the remainder of the division will also be in combat. However, in terms of this particular problem, the 5000 gallon tankers normally used to bring fuel to this FSB could be attached to it. While allocation of these tankers depends on the situation, expecting five (out of thirty-five) seems reasonable. This would eliminate 25,000 gallons of the shortfall.

- Planning factors assume 100% equipment availability. Using the loss rates from ST 101-3, first day losses will total approximately 10%, reducing subsequent requirements by approximately 20,000 gallons.

- The COSCOM has four medium truck companies, each with forty-five 5000 gallon tankers, and four petroleum supply companies, each with the capability of storing and/or distributing fuel in 5000 gallon tankers, 10-50,000 gallon storage tanks, or 55 gallon drums. Twelve (of the 240) tankers would solve the problem, as would one storage tank team with one 10,000 and one 50,000 gallon tank.

- With four combat battalions available, the brigade could have two standing down when the tactical situation permits. This will cut the requirement by approximately 83,000 gallons a day (based on 1 Armor and 1 Mech standing down).

Given the numerous ways in which fuel requirements can be reduced or supply capacity increased, the FSB should be

capable of meeting the fuel requirements.

The final category we have determined to be of critical importance is maintenance. Referring again to ST 101-3, it is apparent that the first day of battle brings the heaviest losses -- 54% of assigned tanks. Using this same percentage for the Bradley Fighting Vehicle (BFV), one can anticipate losses of up to 63 tanks and 58 BFVs. Of these, organizational and direct support maintenance can expect to repair 80%, or 50 tanks and 46 BFVs, to be repairable by organizational and direct support maintenance. Repairs average 10 man-hours, or 960 man-hours total requirement for day one. Recovery operations will add considerably to the actual turn-around time for repairs, but do not add to the number of mechanics required.

In addition to the maintenance teams assigned to the FSB, the DISCOM can augment the FSB with a Tank or Mechanized System Support Team for each maneuver battalion. These teams are intended to locate with the battalion they support. Available man-hours in these teams plus appropriate personnel from the FSB total 1310. This is apparently sufficient to meet the requirements. However, these man-hours are distributed over numerous non-interchangeable repair categories. If greater than expected percentage of damage is done to turrets, for example, the man-hours represented by the tracked vehicle repairman may be irrelevant. In normal circumstances, the FSB would receive backup Intermediate Direct Support Maintenance from the main support battalion. In this situation this is not available. Cross training of

mechanics is a step that must be accomplished in peacetime to alleviate this wartime problem.

The LID DISCOM, which in many cases exchanges damaged equipment rather than repairing it, and which requires augmentation from the corps support command if it is to do any significant repair at all, can provide sympathy, but not much else. The FSB must look elsewhere for not only this backup maintenance, but also division level supply and maintenance management, class IX repair parts support, and maintenance evacuation. These services had been provided by the Main Support Battalion and the division materiel management center (DMMC).

One solution is to bypass the division level and have the FSB tie in directly with COSCOM MMC, supply and maintenance units. FM 63-3J, Combat Service Support Operations - Corps, states that:

" To be responsive, CSS must be flexible. There can be no one way of doing things. CSS planners must not be tied to the traditional methods of support. They must not hesitate to tailor organizations and methods for specific situations." 47

With this attitude, the necessary support relationships can be established. Supply requests, to include class IX, can be sent from the FSB directly to the Corps MMC, which normally supplies the division MSB anyway. The same supplies are coming from the same source to the same user. This procedure has eliminated one intermediate handler. Corps is still able to account for supplies and the user gets what he needs. If necessary, the figures can be forwarded from corps to the division for statistical purposes. Maintenance support

teams can be used to tailor the appropriate IDSM unit to provide inspection and evacuation services at a collection point established by the FSB. Equipment not repairable by the FSB can be taken from this collection point to the designated corps maintenance unit, which provides support on an area basis. Again, this method skips an echelon, but preserves the results without altering any units basic functions in any way. It changes some procedures and the flow of paperwork and materiel. It does not circumvent accountability or responsibility.

At this point it is evident that the Corps can, by tailoring support units and adjusting procedures (e.g., an evacuation policy adjusted to meet specifically the need of the 3rd Brigade), support a heavy brigade attached to the light infantry division. A strength of our combat service support system is the realization that logistics planners and operators must be responsive, flexible, and able to exercise initiative. A willingness and capability to throughput supplies is essential in meeting the fuel and ammunition needs. The flexible "building block" nature of the COSCOM permits them to tailor maintenance units to meet the requirements of the situation. However, the single most significant strength is not the COSCOM but the forward support battalion. The FSB organization embodies the concept of supplying and fixing well forward. It has sufficient capability to interface directly with the COSCOM and continue normal operations in the absence of the Main Support Battalion and the rest of the DISCOM. Because of the

capabilities of the FSB, one can attach it to a LID without having to change the essential nature of the LID DISCOM. When the need for this particular task organization has ended, the Brigade and its FSB can be returned to their parent unit with minimum turmoil to the LID.

Despite the overall success in supporting the heavy-light mix there are several shortcomings that should be addressed. First is the shortfall in fuel storage and distribution capacity of the Forward Support Battalion, which can cause problems even within the heavy unit DISCOM framework. Secondly, the responsibility to control requisition and issue of supply may prove to be too much of an administrative burden to the FSB. Finally, if the FSB is the key to successfully attaching the heavy force to the light force, we are limited to the brigade level when considering such an attachment.

This conclusion is supported by the experience of the 10th Mountain Division (LI) at the National Training Center (NTC).⁴⁰ During Exercise Celtic Cross IV, the 2nd Brigade was augmented with an armor battalion, the 2-77th Armor. Their conclusions were essentially, that light infantry logistics structure cannot support a heavy force. The heavy force must bring its own CSS augmentation, specifically transportation, resupply, and maintenance. Resupply emphasis must be on fuel and ammunition. The after action report recommends that a heavy battalion be OPCON rather than attached. This would appear to be stretching the resources of the FSB, which must then support the battalion, rather than

It would seem more in concert with the CSS concepts already discussed, to augment the heavy battalion with a slice from the FSB and necessary DISCOM and COSCOM elements and attach it. The FSB may be flexible and agile enough to support a battalion OPCON to a light force, but they will certainly sacrifice a great deal of flexibility and agility with respect to the rest of their supported brigade. Neither the FSB (-) nor the detached section can operate as effectively as the FSB as an entity. The unity of command achieved through attachment must also be considered. The LID's responsibility to assure the unit's support may lead to better utilization in combat.

The petroleum problem can be alleviated in several ways. The most convenient, especially in Central Europe, is through host nation support. ** In-ground storage and issue facilities -- gas stations -- are common throughout Germany and so to are tank trucks. In a defensive posture with the LID, the heavy brigade can request additional POL storage and distribution capability through host nation support agreements. The alternative of increasing the number of tankers assigned to the FSB appears the least likely solution at this time due primarily to budget constraints. Increased maintenance, fuel, and personnel requirements and limited strategic lift assets are other undesirable side effects of this option. A final possible solution is in the form of the newly tested Inland Petroleum Distribution System (IPDS). ** Though this tactical pipeline is designed for an immature theater and not intended to reach to the brigade support

area, there is no doubt that it could be so employed in Europe if the circumstances warranted. Unfortunately, the least likely solution -- more tank trucks -- is also the most desirable. It addresses the most difficult part of the fuel problem -- distribution to the user -- which the other alternatives do not.

Finally, the solution to the materiel management burden is already making its way into the system. The decentralized automated service support system (DAS3) in combination with the unit level logistics system (ULLS) was tested by the 197th Infantry Brigade at the NTC and found to be "combat ready".¹¹ The ULLS computers at company and battalion level and the DAS3 computer in the brigade support area were linked to the direct support unit standard supply system (DS4) in the rear at Ft Irwin. Requisitions initiated at company level were automatically relayed through the systems to the rear, consolidated, and added to the higher requisitions. This energized the supply system to fill the requisitions and concurrently generated a printout of usage and on-hand supplies of repair parts. The maintenance posture of the brigade was significantly enhanced while the administrative burden of material management at the brigade level was automated and reduced to near zero. With these systems deployed throughout the Army, there is no reason the heavy brigade cannot link directly into the DS4 at COSCOM, greatly increasing the efficiency of their maintenance and materiel management operations.

These programs are already being implemented and the

necessary equipment is being fielded. They are typical of the logistics community's effort to satisfy the doctrinal sustainment imperatives: Anticipation; Integration; Continuity; Responsiveness; and Improvisation.²² As the logistics community moves toward refining the operational concepts of Army 21 and developing the needed technology and equipment, we can anticipate further progress in these areas.

The Army 21 logistics concept calls for flexible, timely, and reliable support.²³ Organizations will be tailored to meet the situation. Emphasis in supply will be delivery to combat unit users. Maintenance will move toward simplification through direct exchange of modules and components. Repair of high tech equipment will be accomplished far forward by mobile maintenance teams. Research is focused on decreasing bulk and weight of supplies, increasing hauling and handling capability of transport, better reliability of all equipment, and increased use of robotics and automation. The thrust of logistics in Army 21 appears to be to relieve the combat elements of as much responsibility as possible by using combat service support units as far forward as possible.

This philosophy seems to be an extension of current practices. The combat unit commander can look forward to an ever increasing combat service support capability designed to give him maximum flexibility. Today this flexibility allows us to do things like mixing light and heavy forces. In the future, the initiative of the combat force commander will be matched by the flexibility of the logistician. Working

together, they can employ any available force, any way it is needed.

IV. Conclusion.

Assuming that the light infantry division would participate in a central European conflict, history demands it fight as a combined arms force. Essential combat service support for the heavy component of the combined arms team consists of food, fuel, ammunition, and maintenance. While the light infantry division can support the food requirement, fuel, ammunition and maintenance support must come from outside the LID.

Though some shortfalls exist, the forward support battalion of the heavy brigade can effectively support the brigade when attached to a light infantry division. However, to do this the FSB must establish a relationship directly with the corps support command. Neither the parent DISCOM nor the LID DISCOM can provide support to the FSB in this situation.

Though Celtic Cross IV concluded that a heavy battalion cannot be attached to a light brigade, this may not necessarily be true. It would be correct to conclude that the LID cannot support the heavy battalion, however, it does not follow that the battalion cannot be supported. In WW II, tank battalions and tank destroyer battalions were created in part to insure that infantry units had heavy support. When assigned to an infantry unit, these battalions were supported

with fuel and ammunition primarily from army level, as were the armored division combat commands fighting with infantry units. Had a COSCOM been available for Celtic Cross IV, they assuredly could have established the necessary support relationships to support the 2-77th Armor.

AirLand Battle is a combined arms doctrine based on agility, initiative, depth, and synchronization. Light infantry without heavy augmentation is severely limited in its ability to carry out these concepts. The US Army logistics system is determined to support the warfighting doctrine by insuring its own flexibility, responsiveness, and initiative. Applying the warfighting and the support concepts to the light infantry, it is vital that they have a heavy capability and imperative that they find a way to support it. With the current forward support battalion structure and the flexible nature of the corps support command, the army can support a heavy brigade when it is attached to the light infantry division. Though the role of the light infantry division will still be to defend restricted terrain, the ability to control a heavy brigade will allow it to exercise greater initiative, increase its agility, provide depth in the defense, and give it the opportunity to synchronize significantly greater combat power. The US Army's ability to support the heavy brigade attached to the light infantry division is implicit in our doctrine. In this case, the facts support the implication.

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[illegible]

[illegible][illegible][illegible]

Ammunition Requirements

Tank, M1:

rds/wpn X # of wpns X wt of rd = STONs required

1st day:	78	58	72	162.9
next day:	47	58	72	98.1

BFV, M2:

25mm				
1st day:	96	54	1.87	4.8
next:	76	54	1.87	3.8
TOW				
1st day:	.8	54	98.8	2.1
next:	.6	54	98.8	1.6
4.2 Mortar				
1st day:	163	6	40	19.6
Next:	99	6	40	11.9

TOTAL:

1st day:	$162.9(2) + 4.8(2) + 2.1(2) + 19.6(2) = 378.8$
Next:	$98.1(2) + 3.8(2) + 1.6(2) + 11.9(2) = 230.8$

Fuel Requirements.

MOGAS, TK BN: $3.9(12) + 38(12) + 25(12) + 101(63) = 1438.8$

MOGAS, MECH BN: $5.8(12) + 25.2(12) + 32.1(12) + 101(21.2) = 2898$

MOGAS, BDE HHC: $8.9(12) + 9.4(12) + 4(12) = 267.6$

MOGAS, FSB: $44.5(12) + 29(12) + 64.7(12) + 21.2(101) = 3799.6$

Diesel, TK BN: $.6(12) + 5(12) + 671.5(4.2) + 3758.7(5.7) + 3150.4(5.5) + 132(101) = 55,156.1$

Diesel, MECH BN: $5.3(12) + 45.8(12) + 144.7(4.2) + 1654.3(5.7) + 1239.1(5.5) + 109.1(101) = 28,484.4$

Diesel, BDE HHC: $5(12) + 8.3(4.2) + 72.7(5.7) + 76.6(5.5) + 13(101) = 2243.6$

Diesel, FSB: $21(12) + 13.9(12) + 31.9(12) + 21(12) + 11.7(4.2) + 109.9(5.7) + 130(5.5) + 153(101) = 17,897.1$

MOGAS Total: $1438.8(2) + 2898(2) + 267.6 + 3799.6 = 12740.8$

Diesel Total: $55156.1(2) + 28484.4(2) + 2243.6 + 17897.1 = 187421.7$

Total Fuel: $187421.7 + 12740.8 = 200,162.5$

Maintenance Requirements

Number of M1 Tanks: $58 \times 2 = 116$

Number of BFVs: $54 \times 2 = 108$

Expected losses, 1st day: 54%

Repairable thru DS level: 80%

Average man-hours/repair 10

$116 \times .54 = 62.6$ tanks lost

$63 \times .80 = 50.4$ tanks repairable

$108 \times .54 = 58.3$ BFVs lost

$58 \times .80 = 46.4$ BFVs repairable

$(50 + 46) \text{ vehicles repairable} \times 10 \text{ man-hours/repair} = 960$
man-hours on heaviest day

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